ABSTRACT

Pneumonia is a serious lung infection requiring early, accurate diagnosis. Traditional methods rely on chest X- rays, but interpreting these images can be challenging due to variability in radiologist expertise. This study aims to enhance pneumonia detection using deep learning, specifically MobileNetV2, for its efficiency and potential deployment in resource-limited settings. Transfer learning was applied to reduce training time, while data augmentation (rotation, flipping) was used to increase robustness and reduce overfitting. To balance accuracy and computational demands, different input dimensions (128x128 to 224x224) and hyperparameter tuning were explored for potential real-time use in future settings. Results showed that MobileNetV2 achieved high accuracy, reaching 99% with non-augmented data and an F1- score of 99%. After augmentation, performance slightly declined, with precision dropping to 94.97% and recall to 98.13%. The F1-score decreased from 99.36% to 98.24%. Despite this, the model retained strong recall (95% for normal cases and 98% for pneumonia cases), indicating robust classification. This study uniquely evaluates MobileNetV2's performance across various input dimensions, demonstrating its feasibility for pneumonia detection, especially in low-resource and mobile settings. Future work will address challenges like class imbalance and further optimization for edge deployment, paving the way for accessible and consistent pneumonia diagnosis in diverse clinical environments, ultimately improving patient outcomes.

Keywords: *pneumonia detection, MobileNetV2, deep learning, chest x-ray, data augmentation*